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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/065,552 | 10/29/2002 | Shigeru Sawada | 39.002-AG | 7687 |

29453 7590 12/03/2004

JUDGE PATENT FIRM
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JAPAN

EXAMINER

LOUIE, WAI SING

ART UNIT PAPER NUMBER

2814

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/065,552 | SAWADA ET AL. | |
| | Examiner | Art Unit | |
| | Wai-Sing Louie | 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 7-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/14/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant elects Group I, claims 1-6 drawn to a method for non-invasively profiling a semiconductor wafer with traverse. However, Group I drawn to a method for non-invasively profiling a semiconductor wafer and Group II drawn to the compound semiconductor wafer. The inventions Group I and Group II are related as process of making and product made and the inventions Group I and Group II belong to different classes, which require separate searches and considerations. The inventions are distinct each from the other and the restriction is required under 35 U.S.C. 121. The restriction is proper and the restriction is final.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US 3,803,489).

With regard to claims 1 and 4, Miller discloses a method of determining the doping (carrier concentration) profile in a semiconductor wafer (col. 3, line 38 to col. 7, line 3 and fig. 3) using "C-V technique" (col. 1, lines 18-23), where the carrier concentration profiling method includes:

- Contacting a liquid electrode 31 superficially on the wafer 11b (col. 4, lines 34-36 and fig. 2);
- Employing an applied voltage above 4 volt to profile the wafer's C/V characteristic (fig. 4), but does not disclose the applied surpassing 10V. However, the curve 37 (liquid electrode) extends more than 4 volt. Since the applicant has not established the criticality of the voltage stated and since these voltages are in common use in similar devices in the art, it would have been obvious to one of ordinary skill in the art to use these values in the device. Where patentability is said to be based upon particular chosen dimension or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claims 2-3 and 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US 3,803,489) in view of Endredi et al. (US 5,237,266).

With regard to claims 2-3, Miller does not disclose the liquid electrode is an aqueous EDTA solution contains 80% or more. However, Endredi et al. disclose measuring the concentration of carrier in the semiconductor using "C-V technique" (Endredi col. 1, lines 17-20 and lines 38-42) and the liquid contact is EDTA solution (Endredi col. 8, lines 50-61). Endredi et al. teach the EDTA liquid electrode measurement is more accurate and reliable (Endredi col. 9, lines 13-21). Miller and Endredi et al. have substantially the same environment of measuring the carrier concentration profile using the "C-V technique". Therefore, it would have been obvious for the one with ordinary skill in the art to modify Miller's device with the teaching of Endredi et

al. to provide the EDTA solution as liquid electrode in order to have an accurate and reliable measurement.

Endredi et al. disclose the EDTA solution is a 0.1 molecular solution, but do not disclose an aqueous EDTA solution contains 80% or more. Since the applicant has not established the criticality of the concentration of EDTA solution stated and since the different of concentrations are in common use in similar devices in the art, it would have been obvious to one of ordinary skill in the art to use these values in the device. Where patentability is said to be based upon particular chosen dimension or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In *re Woodruff*, 919 F2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

With regard to claim 5, Miller modified by Endredi et al. in claim 2 above disclose using EDTA solution as liquid electrode to measure the carrier concentration profile in a n-type GaAs material semiconductor (Endredi col. 8, line 51), but do not disclose the EDTA solution is for melting Ga metal. Although Endredi et al. do not explicitly state that the EDTA solution is melting Ga metal. The prior art EDTA solution functions as a solvent. Statements of intended use do not structurally distinguish claims over prior art, which can function in the same manner, be labeled in the same manner, or be used in the same manner. See in *re Pearson*, *Ex parte Minks*, and In *re Swinehart*.

With regard to claim 6, in addition to the limitations disclosed in claim 1, Miller modified by Endredi et al. also disclose:

- EDTA solution melting the Ga metal and solidifying to form a metal Ga electrode
(see claim 5 on same materials function the same as claimed);

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- Subsequently to profile the carrier concentration via the solidifying Ga electrode (Endredí col. 9, lines 13-20).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (571) 272-1709. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wsl

November 15, 2004.